

CENTRAL INTELLIGENCE AGENCY
INFORMATION REPORT

COUNTRY USSR
SUBJECT Engineer Matrosov's Anchor

DATE DISTR. 5 AUG 1954
NO. OF PAGES 3

50X1 PLACE ACQUIRED
50X1 DATE ACQUIRED BY
DATE OF INFORMATION

NO. OF ENCLS. /
(LISTED BELOW)
SUPPLEMENT TO
REPORT NO.

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SOURCE

1. Much importance is given to the anchor in the Soviet fleet. The holding power, its behavior from the moment it is dropped from the ship to the time it acquires complete holding ability, plays a decisive role in determining the quality of the anchor.
2. Although there are many forms of anchors, they can be divided into two groups. To the first group belong all anchors whose stocks cannot be drawn into the hawsepipe and which dig into the ground with only one fluke. The other group includes all anchors which do not have a stock and which dig into the ground with two flukes.
3. The admiralty anchor which belongs to the first group is most widely used. This anchor penetrates into the ground very well and has a holding power which is equal to 15 times the weight of the anchor and is easy to handle. However, in the case of a long fluke much difficulty is encountered in dropping and recovering the anchor and the fluke which protrudes out of the ground, sometimes catches on the bottoms of passing ships or on anchor cables of other ships and also frequently damages fishing nets. With progress in shipbuilding technology, the admiralty anchor does not satisfy all the demands required of it as a holding apparatus. New anchor designs were originated which belong to the second group. These anchors do not have long flukes and can easily be drawn into the hawsepipe.
4. The navy and the merchant fleet predominantly use the Kholi (Hall) anchor which belongs to the second group and all Kholi-type anchors meet

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All-Union standards.

5. The anchors of the second group have wide-spaced flukes. This construction feature did not justify the expectations of the designers. The ability of the anchor was disproved in practice. In reality the resistance of the ground on each fluke proved different because of the non-uniformity of the ground. The result of this was that, when the anchor cable receives its maximum stress, a rotating force couple is set up which tends to twist the anchor loose from the ground, depriving it of its holding ability until it again digs into the ground. This maneuver is repeated. This circumstance explains the low holding ability of the Khol (Hall) - type anchor which has a holding power of only four to five times its own weight.
6. Engineers and designers have frequently thought about improving the anchor design.
7. The anchor proposed by Engineer (fnu) Matrosov, in comparative tests under various natural conditions, proved significantly better than all other anchors. In order to simplify production of the anchor, Engineer Matrosov proposed a welded variant of the retractable anchor of increased holding power. /Enclosure (A) is a sketch of Matrosov's anchor which was prepared by source. / Flukes (7) adjoin the stem (1) on the left and on the right in a form approximating a triangle. As is apparent from this drawing, in contrast to the previous anchor designs, the flukes are placed as close together as possible. For the purpose of increasing the rigidity, the flukes (7) are reinforced with ribs (6). The edges of the surfaces of the flukes (7) are beveled so that they will better cut into the ground. In the lower part of the fluke, approximately one-third of the distance from the base, are the rods (3) with flanges (4) (stock flanges) at their ends which prevent the anchor from overturning. Below the rods (3) are adjoined two brackets which assist the flukes to dig into the ground. Because the axis of the rods (3) are located above the axis of the swivel (joint) of the stem (1), it has become possible to equalize the holding ability of the anchor in various types of ground.
8. In soft, sandy-muddy ground the anchor, with its rods and flanges, digs in and thus increases its holding power. In firm and in pebble grounds, the position of the joints, as shown on the drawing, increases the stability of the anchor and keeps it from overturning.
9. The approximation of the axis to a line passing through the gravitational center of the flukes contributes to the initial quick burying of the anchor into the ground and the moving of the flukes on the side joints. The eccentric position of the joint of the stem in relation to the axis of the stock contributes to this condition.
10. Experiments showed that Matrosov's anchor system secured the ship quicker and safer with a better burying of the anchor into the ground with no overturning.
11. With increased pull the anchor plows both a straight and a zigzag furrow, depending upon the direction of the pulling force and digs deeper and deeper and submerges entirely into the ground, thus increasing its holding ability. The following comparative table of the maximum holding power of anchors obtained in tests under the same natural conditions graphically illustrates the superiorities of Engineer Matrosov's anchor over all other types of anchors:

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Type of Ground	Maximum holding power of the anchor in units to be multiplied by the weight of the anchor		
	Kholl (Hall)	Admiralty	Matrosov
Mud silt	4.8	5.3	23.9
Firm sand	2.3	7.5	51.5
Large stones	8.6	23.8	45.3

As is apparent from this table the holding ability of Matrosov's anchor in muddy ground is five times that of the Kholl anchor and more than four times that of the Admiralty anchor. Similar observation can be made with other types of ground. At the same time the merchant fleet was given an order to adopt this system gradually.

12. The Matrosov anchor system began to be used more widely in 1950. It was at this time that the merchant fleet was ordered to make a gradual adaptation of this system.

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Enclosure: (A) Sketch of Matrosov's Anchor with legend.

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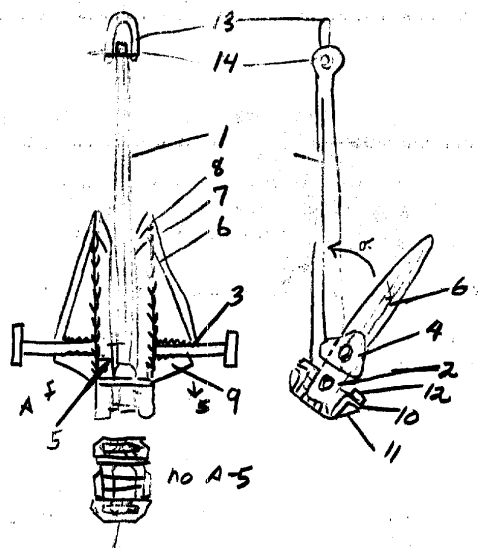
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SKETCH OF MATROSOV'S ANCHOR WITH LEGEND

50X1



For anchors with a weight up to 75 kilograms

$\alpha = 28^{\circ} - 30^{\circ}$

For anchors with a weight more than 100 kilograms

$x = 32^{\circ} - 35^{\circ}$

Legend:

1. Stem (shank)
2. Hinge pin
3. Fluke stock
4. Stock flange
5. Check fins
6. Fin web (rib)
7. Outward fin
8. Inward fin
9. Bracket (gusset plate)
10. Shoulder (elbow or angle bracket)
11. Knee (bracket)
12. Cleat (baffle plate)
13. Shackle
14. Shackle pin

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